

(12) UK Patent Application (19) GB (11) 2 272 203 (13) A

(43) Date of A Publication 11.05.1994

(21) Application No 9321708.1

(22) Date of Filing 21.10.1993

(30) Priority Data

(31) 337792

(32) 29.10.1992

(33) CH

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(51) INT CL⁵

B65D 19/32

(52) UK CL (Edition M)

B8H HLC

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(58) Field of Search

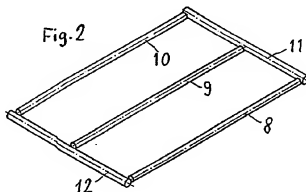
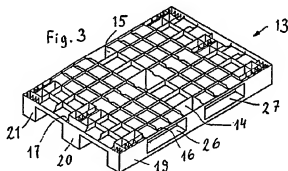
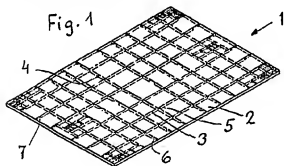
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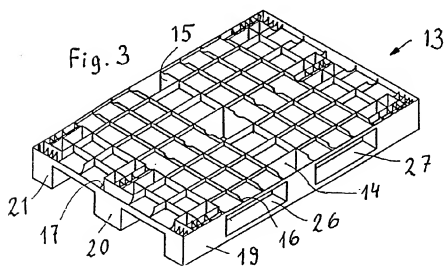
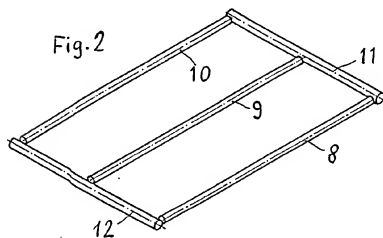
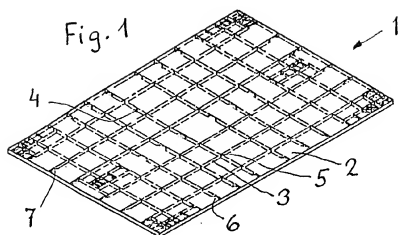
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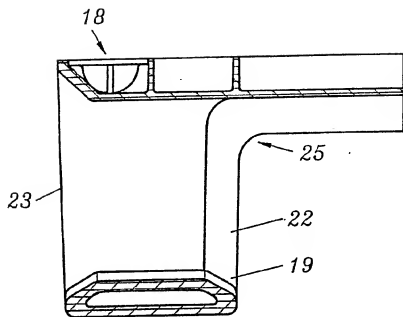
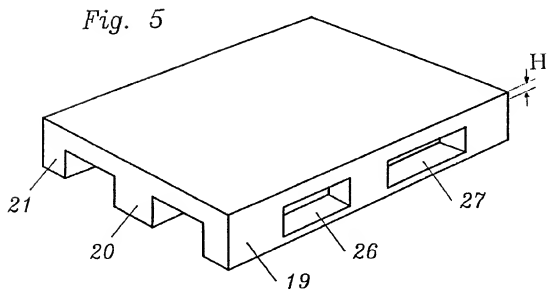
(54) Plastic pallet

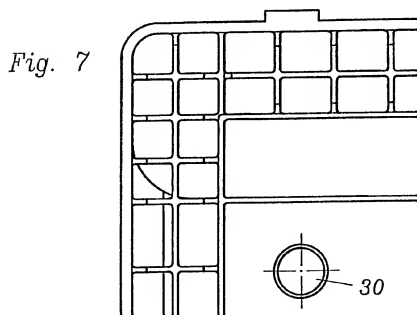
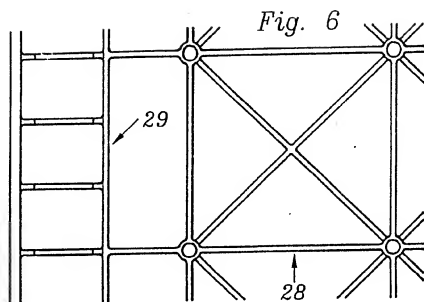
(57) A stacking pallet consists of a top 1 and a bottom (13) component, which are made of plastic and welded together. Each component has ribbing which is provided with complementary semi-circular cut-outs in which are sandwiched reinforcement tubes 8 to 12. The pallet can be used in the hygiene sector, for instance in the food and pharmaceutical industries.

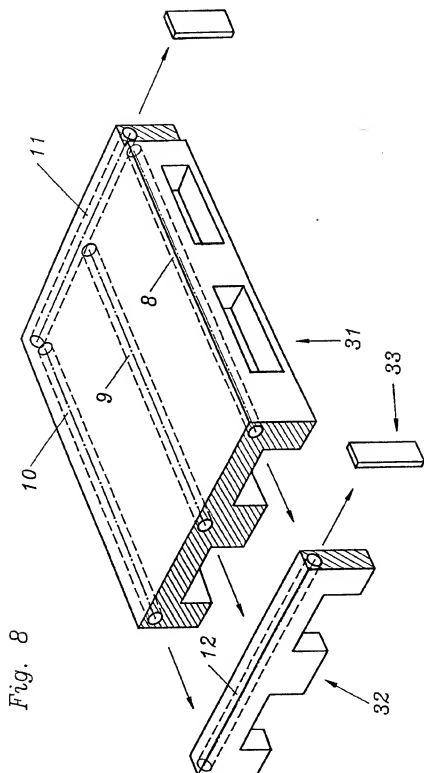


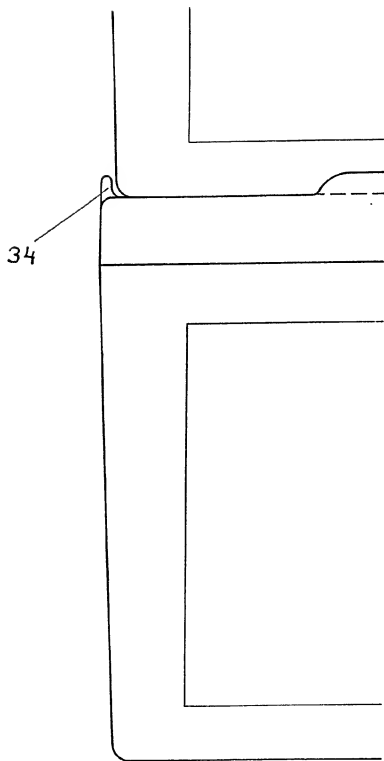
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*Fig. 4**Fig. 5*





*Fig. 9*

- 1 -

Pallet

This invention consists of a pallet.

Pallets made of wood are generally well-known. Pallets of this type have proven to be unsuitable for certain applications because wood is quick to absorb organic materials, making the pallets unhygienic. The task of this invention is therefore to create a pallet that is also suited to use in the hygiene sector, for instance in the food and pharmaceutical industries.

This problem is solved in accordance with the present invention by a pallet with the features listed in the part of Patent Claim 1 concerned with characterization.

Additional useful designs of the invention are stated in the dependent claims.

Another important advantage of the pallet in accordance with the present invention is that it can carry a heavy load and is cost-effective.

In the following, the invention is explained in detail using a drawing as example. This drawing shows:

Fig. 1 a representation in perspective of the top of a pallet in accordance with the present invention,

Fig. 2 a representation in perspective of a reinforcement on this type of pallet,

Fig. 3 a representation in perspective of the bottom of a pallet in accordance with the present invention,

Fig. 4 a cross-section in the vicinity of a corner of this type of pallet,

Fig. 5 a representation in perspective of a finished pallet according to the invention,

Fig. 6 a schematic partial horizontal projection of the interior ribbing in this type of pallet,

Fig. 7 a schematic partial horizontal projection of a part of the pallet with a centring pin,

Fig. 8 a representation in perspective explaining one method by which this type of pallet can be recycled,

Fig. 9 a detail of the border on this type of pallet.

The top 1 of a pallet shown in Fig. 1 in accordance with an initial model of the invention is, for instance, designed in the form of a base plate 2 made of plastic with six longitudinal ribs and ten transverse ribs exhibiting common points of intersection and serving to reinforce the top. Hence, for example, longitudinal rib 3 is connected to transverse rib 4 at point of intersection 5. At the height of the top 1, this ribbing extends up to the level of the border of the base plate 2. This border level is determined by the border of the four outer walls of the base plate 2. The transverse ribs in the vicinity of the longitudinal edges and of a longitudinal line in the middle of the top exhibit recesses 6 or 7 shaped like a half-moon, as do the longitudinal ribs in the vicinity of the transverse edges of the top.

In Fig. 2 the five tubular reinforcements 8 to 12, preferably made of steel, are presented. The longer reinforce-

ments 8, 9 and 10 are somewhat shorter than the longitudinal edge and the shorter reinforcements 11 and 12 are somewhat shorter than the transverse edges of the top 1.

Fig. 3 shows the bottom 13 of the pallet, which is likewise made of plastic and has six longitudinal ribs and ten transverse ribs. The ribs of the bottom 13 are quit a bit higher than the ribs of the top 1, as can be seen in Fig. 3 in the example of longitudinal rib 14 and transverse rib 15. This ribbing reaches to the border level determined by the height of the four outer walls of the bottom 13, whereby the transverse ribs in the vicinity of the longitudinal edges and of a longitudinal line in the middle, as well as the longitudinal ribs in the vicinity of the transverse edges of this bottom, also have half-moon-shaped recesses 16 and 17.

In Fig. 4, one of these half-moon-shaped recesses is shown in detail. The diameter of these recesses corresponds to the diameter of the respective tubular reinforcements 8 to 12 (Fig. 2), whereby it is better if all tubular reinforcements have the same diameter. For certain applications, however, the diameter of the longitudinal reinforcements 8, 9 and 10 could be slightly larger than the diameter of the transverse reinforcements 11 and 12.

The bottom 13 has three longitudinal runners 19, 20 and 21 (Fig. 3 and 5), whose outer walls 22 and 23 (Fig. 4) form a small angle to the perpendicular in such a way that the

width of the runner on the floor 24 is somewhat less than its width in the upper area 25 to facilitate skid protection while stacking. The runners can have lateral recesses 26 and 27 (Fig. 3 and 5).

Fig. 5 shows a finished pallet made of plastic, polyethylene for instance. The bottom 13 and the top 1 of the pallet are welded together. The bond is in the upper area of the pallet and is made by the butt-welding method. In this model of the invention, the geometry of the ribbing on the top 1 corresponds to that of the ribbing of the bottom so that the fronts of the ribs of both parts are welded together during production of the pallet. Between the bottom and the top, the tubular reinforcements 8 to 12 or, if advisable, only certain of these, can be inserted in the half-moon-shaped recesses 18 (Fig. 4). Mounting the tubular reinforcements 8 to 12 loosely and with a bit of play on the ends is preferable, since this enables them to move in the event of thermal expansion. The tubular reinforcements are therefore fitted (wedged in) in such a way that they can expand in the event of changes in temperature. Another model of the invention allows a large-surface, thin deck to be welded between the bottom and the top, making it unnecessary for the ribbing of both parts to correspond geometrically. In principle, the finished pallet can have the same dimension as wooden Euro-pallets designed in accordance with DIN (= German Industrial Standard) 15141. They can also be used as high-stacking pallets.

For mass production, the top can also be given various heights H (Fig. 5).

Fig. 6 shows by way of example that the ribbing, at least in part, can form an x-shaped pattern in the central area 28 of the pallet if this is preferred. In the pallet's border area 29 (Fig. 6), the ribs can be placed closer together.

Fig. 7 shows that, if so desired, the top and bottom can have four corresponding centring pins 30 to better join the two parts. Centring pins of this kind are intended especially for pallets without tubular reinforcements, since otherwise these will exert a centring influence by themselves during assembly.

Fig. 8 shows very graphically how the pallet can be cut into two parts 31 and 32 by sawing between the ends of the longitudinal reinforcements 8, 9 and 10, and the transverse reinforcement 12 in order to pull this out after taking an end piece 33 off of the already separated part 32 with the transverse reinforcement 12. After this, all tubular reinforcements can be pulled out with ease.

In Fig. 9, a detail of the border 34 is shown, which is sprayed on the upper surface of the pallet and whose purpose is to keep the pallet from skidding. This makes the pallet capable of being stacked. The variant without skid-proofing can only be placed one on top of the other.

The figures show that a load transmission is facilitated by a reinforced plastic structure on the corners. Furthermore, it is better to reinforce the outer walls, that is, make them thicker than the others, to protect the pallet from damage. For example, the outer walls can be 4 to 10 mm in thickness.

If hygienic aspects must be taken into consideration, the pallets can be designed in such a way that they are easy to clean, that is to say, with no channel sections, dead corners or other corners in which dirt or water could collect. The border 34 should preferably break off at a few places so that water can drain out.

By preference, the injection-molded pallets are produced from recycled materials and can themselves be recycled. The front of the runners can have visible markings or be smooth for sticking on labels, for instance.

Claims

1. Pallet characterized by the fact that a top (1) and a bottom (13) component are welded together, and that the top (1) and the bottom (13) are made of plastic.

2. Pallet according to claim 1, characterized by the fact that the top (1) and/or the bottom (13) have interior ribbing.

3. Pallet according to claim 2, characterized by the fact that the ribbing of the top (1) and the ribbing of the bottom (13) have the same rib pattern.

4. Pallet according to claim 2 or 3, characterized by the fact that the ribbing on the top (1) and the ribbing on the bottom (13) have recesses into which reinforcing elements (8,9,10,11,12) are wedged.

5. Pallet according to claim 4, characterized by the fact that the reinforcing elements are wedged in loosely.

6. Pallet according to one of the claims 1 to 5, characterized by the fact that the bottom (13) of the pallet has runners (19,20,21).

7. Pallet according to one of the claims 1 to 6, characterized by the fact that the top (1) and the bottom (13) of the pallet are equipped with centring and counter pins (30) that work in combination with one another.

8. Pallet according to one of the claims 1 to 7, characterized by the fact that the upper surface of the top (1) has a border (34) and/or that the outer runners (19) are wider on the top than on the bottom in order to keep the pallets from skidding when they are stacked.

9. Pallet according to one of the claims 4 to 8, characterized by the fact that the recesses are round or slit-shaped, and that the reinforcing elements are tubes (8,9,10,11,12) or flat bars.

10. Pallet according to one of the claims 1 to 9, characterized by the fact that the top (1) and the bottom (13) are welded together by the butt-welding method.

Amendments to the claims have been filed as follows

1. A pallet with a top part and a bottom part made of plastic and welded together, characterized in that the top
5 part and the bottom part have an interior ribbing, such that the ribbing of the top part and the ribbing of the bottom part have the same rib pattern in correspondence with the welding line, that the ribbing on the top part and the ribbing on the bottom part have half-moon-shaped recesses interrupting the
10 continuity of the rib pattern, and that reinforcing tubes are located into said recesses.
2. A pallet according to claim 1 characterized in that the reinforcing tubes are wedged in loosely.
15
3. A pallet according to claim 1 or 2 characterized in that the bottom part of the pallet has runners.
4. A pallet according to any one of the claims 21 to 3
20 characterized in that the top part and the bottom part of the pallet are equipped with centring and counter pins that work in combination with one another.
5. A pallet according to any one of claims 1 to 4
25 characterized in that the upper surface of the top part has a border and/or that the width of the outer runners is smaller on the bottom than on the top in order to provide skidproofing while stacking.
- 30 6. A pallet according to any one of the claims 1 to 5 characterized in that the top part and the bottom part are welded together by a "mirror-welding method".
7. A pallet according to any one of the claims 1 to 6
35 characterized in that the ribbing comprises transverse ribs and longitudinal ribs, that the recesses are made into the transverse ribs in the vicinity of the longitudinal edges and

the longitudinal ribs in the vicinity of the transverse edges of the pallet.

8. A pallet according to claim 7 characterized in that
5 further recesses are made in the transverse ribs in a longitudinal line in the middle of the pallet.

9. A pallet according to claim 8 characterized in that there
are three longitudinal tubes and two transversal tubes located
10 in such a manner that there is gap between one end of each longitudinal tube and the adjacent transversal tube.

10. A pallet according to claim 9 characterized in that it
can be cut by sawing between the ends of the longitudinal
15 tubes and the transverse tubes and by sawing two end pieces off of the already separated parts with the transverse tubes in order to pull out the tubes.

11. A pallet substantially as hereinbefore set forth with
20 reference, to and/or as illustrated in, the accompanying drawings.

Relevant Technical Fields

(i) UK CI (Ed.L) B8H (HLC, HQG, HQH, HQJ, HRB)

(ii) Int CI (Ed.5) B65D 19/22, /24, /26, /32

Search Examiner
R D CAVILL

Date of completion of Search
26 NOVEMBER 93

Databases (see below)

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

Documents considered relevant
following a search in respect of
Claims :-
1-10

(ii) ONLINE DATABASES: WPI

Categories of documents

X:	Document indicating lack of novelty or of inventive step.	P:	Document published on or after the declared priority date but before the filing date of the present application.
Y:	Document indicating lack of inventive step if combined with one or more other documents of the same category.	E:	Patent document published on or after, but with priority date earlier than, the filing date of the present application.
A:	Document indicating technological background and/or state of the art.	&:	Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages		Relevant to claim(s)
X	GB 2209321 A	(CRAEMER) See whole document	1-6, 9 and 10
X	GB 1575143	(METAL CLOSURES) See figures and abstracts and page 2 lines 50-51	1, 2, 6, 10
X	GB 1533886	(SCHOELLER) See figures and abstracts	1, 2, 3, 6, 8, 10
X	GB 1512450	(MITSUBISHI) See figures and abstracts	1, 2, 6, 10
X	GB 1494562	(A SCHOELLER) See figures and abstracts	1, 2, 3, 7, 10
X	GB 1373802	(SCHOELLER) See figures and abstracts and page 2 lines 47-50	1, 2, 6, 7, 10
X	EP 0227033 A2	(REMAPLAN) See figures particularly Figure 4 and abstracts	1, 2, 6, 7, 10
X	US 4403555	(FORREST) See figures and abstracts	1, 2, 3, 6, 10
X	DE 4142659 A1	(AEPFELBACH) See figures and Derwent abstract	1, 2, 3, 4, 5, 9, 10

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).